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①⑨ ②A **CANADIAN PATENT**

⑤④ **METHOD FOR THE TREATMENT OF PLASTIC FILM IN A
SO-CALLED SHRUNK-ON FILM WRAPPING WITH THE
OBJECT OF OBTAINING A PLASTIC FILM THAT CAN
EASILY BE RIPPED OPEN**

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Granted to Tetra Pak International AB, Sweden

②① **APPLICATION No. 182,556**
②② **FILED 731003**

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No. OF CLAIMS 7

The present invention relates to the wrapping of an article in plastic film to produce a so-called "shrunk-on" film wrapping, by the method which comprises conveying the article to be wrapped to a wrapping station at which station it is wrapped in a plastic film passing to the wrapping station from magazine rolls, the film being sealed along at least one sealing seam and freed from the remaining plastic film on the magazine rolls. The wrapped article is then passed through a heating zone to shrink the plastic film. In particular, the present invention relates to the treatment of the plastic film before wrapping of the article which allows the wrapping to be readily ripped open.

In packaging increasing use is made of "shrunk-on" film for holding together a number of collected or stacked articles in their collected or stacked state, as it has been found in many cases to be practical and cheaper to use "shrunk-on" film wrapping instead of the customary method of assembling articles in different types of collecting containers. "Shrunk-on" film wrapping is also used, in combination with supporting sheets and trough-shaped containers to provide support for the assembled articles and to reinforce the "shrunk-on" film wrapping.

It has been found, that there is a need for the "shrunk-on" film wrapping to be easily ripped open. A "shrunk-on" film is relatively tough and strong and therefore it is not easy to open the wrapping without the use of a sharp implement such as scissors or a knife. The "shrunk-on" film is also difficult to tear and an acceptable controlled tearing is impossible to achieve.

It has previously been suggested, that in order to facilitate the ripping open of a "shrunk-on" film wrapping a ripping strip should be placed on the inside of the "shrunk-on" film, i.e., between the "shrunk-on" film wrapping and the articles held together by the wrapping, the tearing strip so having one end accessible from outside the "shrunk-on" film wrapping. By grasping

the accessible part of the ripping strip, which consists of a flexible, unshrinkable and only to a small degree, elastic material, the "shrunk-on" film can be ripped open and the film splits along an extension which substantially corresponds to the tearing path of the ripping strip.

It has however, been found difficult to rip a "shrunk-on" film even with a ripping strip. This is due to the toughness of the plastic film. The presence of the ripping strip also entails higher costs for the "shrunk-on" film wrapping. The present
10 invention provides a method of forming a "shrunk-on" wrapping on an article which is readily ripped open.

It has now been found in accordance with the present invention that such a wrapping may be achieved by perforating the plastic film after it has left the magazine rolls but before it is introduced into the heating zone suitably by means of knife or punch devices to form at least two perforated lines extending preferably parallel with one another and over the width of the plastic film. The plastic film material between the perforation
20 lines is thus readily removed by tearing along the perforation lines when the plastic film wrapped is to be torn open.

According to the present invention therefore there is provided in the wrapping of at least one article in a plastic film by the "shrunk-on" film wrapping method, which method comprises continuously conveying the articles to be wrapped to a wrapping station, wrapping said articles at said wrapping station in a heat shrinkable plastic film continuously passed to said wrapping station from film magazine rolls, heat sealing said film wrapped around said article along at least one sealing seam; separating said sealed and wrapped film from the film passing to said wrapping
30 ping station and passing said article wrapped in said film through a heating zone to shrink said film in said article, the improvement in which said film between said magazine rolls and said heating zone

is perforated with a pair of perforation lines extending across the width of the film and spaced longitudinally of the film, said film being wrapped at said wrapping station in relation to the article such that the lines of perforation are in a pre-selected position whereby to provide a tear strip in said wrapping for readily opening said wrapping.

Particular embodiments of the method of the present invention are illustrated in the accompanying schematic drawings, in which:

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Fig. 1 illustrates the general method of a "shrunk-on" film wrapping.

Fig. 2 illustrates in side view a sealing device for use in the method of "shrunk-on" film wrapping of Fig. 1 which device is provided with a device for operating in accordance with the method of one embodiment of the invention.

Fig. 3 illustrates in side view a further embodiment of a device for the realization of the method in accordance with the invention and

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Fig. 4 shows a number of articles, wrapped in a "shrunk-on" film treated in accordance with the method indicated by the invention.

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Fig. 1 illustrates the known procedure for the wrapping of articles in "shrunk-on" film. The articles 1 are conveyed on a roller conveyor 2 or a similar transportation device to a collecting board 3. A plastic film 5 from a roll 4, located above the articles 1 is welded to a plastic film 7 from a roll 6 located beneath the transportation device 2. The welding together of films 5 and 7 is carried out after a number of articles 1 have been conveyed towards, and enveloped by the plastic films 5 and 7, which are sealed to each other by a seam, the articles thus being wrapped. The sealing is carried out by means of a sealing die 8 and a counter-pressure die 9 serving as a holding tool.

The sealing die 8 may be a constantly heated sealing die, either or both the sealing die 8, and the counter-pressure die 9 being moveable relative to one another. A further roller conveyor 11 conveys the wrapped articles 10 to a conveyor belt 12. The conveyor belt 12, passes the articles 10 in a film into a shrinkage tunnel 13 at a speed suitable to the shrinking operation. A cooling fan 15 located beneath the conveyor belt 12 and downstream of the tunnel 13 accelerates the cooling of the plastic film wrapping.

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In FIG. 2 the sealing die 8 and counter-pressure die 9 are in a position where they have moved apart after a welding operation. The sealing die 8 is included with sealing strips 16 of electrical resistance material providing sealing surfaces to effect welding operation in sealing a plastic film envelope. The sealing is carried out with heat and high pressure applied along a zone superimposed plastic films 5 and 7. The sealing die 8 is provided with a recess 17 between the sealing surfaces 16, in which recess is arranged a knife 18, for example in the form of a heated wire, for the cutting of the two welded plastic films 5 and 7 after the welding thereof. The sealing die 8 also includes cooling ducts 19.

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The sealing die 8 in accordance with one embodiment of the present invention has a yoke 20 which is spring-loaded by means of a spring element 21 and on which yoke serrated knives 22 are adjustably fixed by screws 23. The knives 23 cut perforation lines through the plastic films 5 and 7 and are provided with serrated edges which produce perforations which allow tearing of the plastic material. Suitable knives have 90° serrated edges. The counter-pressure die 9 has counter-pressure surfaces 24 and a recess 25 between these surfaces. The knife 18 is moved into the recess 25 to cut the plastic films 5 and 7 when the plastic film wrapped articles are separated from the plastic films 5 and

7 from rolls 4 and 6.

10 In accordance with a second embodiment of the present invention, perforation of the plastic films 5 and 7 is carried out during their travel from the magazine rolls 4 and 6 to the articles to be wrapped. Thus in Figure 3 a double-edged knife element 27, is arranged to perforate the plastic film against a holding-up tool 28. The knife element 27 is adjustable to provide the perforation lines in a desired position on the plastic film wrapping taking into account the shape of the articles being wrapped. Such perforation lines can be made on several places on the wrapping and to facilitate this, a further double-edged knife 29 is provided.

Fig. 4 indicates how, the different perforation lines may be arranged on the wrapping in accordance with different embodiments of the invention. Between the perforation lines 33 and 34 a portion 35 and 36 respectively is obtained which forms the ripping strip.

20 Many variations can be made in the method of the present invention. Thus, for example, it is usual for the articles 1 to be conveyed to the welded films 5 and 7 by means of a feeding device. As a result the one side as well as the top and bottom of the assembled articles are enveloped by the plastic films 5 and 7. The plastic films, may be formed of polyethylene, polypropylene or a laminate thereof and may also be formed of oriented plastic film material of this type.

30 It is of course possible within the scope of the invention to modify the methods described for the treatment of the plastic film in a so-called "shrunk-on" film wrapping. The knife elements 22, 27 and 29 may thus be such that the perforation of the plastic film takes place from the side of the film opposite to that which has been shown in the drawings. The direction of the plastic film between the magazine rolls 4 and 6 and the actual

point of attachment to the articles to be wrapped may also be different from that shown. It is customary in this connection to use guide rolls or bars to impart a desired direction to the film. In accordance with the embodiment shown in Figure 2 only one knife 22 may be provided for perforating the plastic films 5 and 7 which are being welded together. It is also possible to fix one of the dies, preferably the counter-pressure die 9, whilst the other die 8 is movable. The dies 8 and 9 can be mutually displaceable if desired. The articles 10 which are wrapped by the plastic film are usually conveyed to the joined plastic films 5 and 7 by means of a feeding device, whence one side and the top and bottom of the assembled articles are enveloped by the plastic films 5 and 7 during the feeding process and the remaining side is wrapped during the movement of the dies 8 and 9. The knife element may be arranged so that it perforates the plastic film to form perforation lines which run parallel or diverge.

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THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. In wrapping of at least one article in a plastic film by a "shrunk-on" film wrapping method, which method comprises continuously conveying the articles to be wrapped to a wrapping station, wrapping said articles at said wrapping station in a heat shrinkable plastic film continuously passed to said wrapping station from film magazine rolls, heat sealing said film wrapped around said article along at least one sealing seam; separating said sealed and wrapped film from the film passing to said wrapping station and passing said article wrapped in said film through a heating zone to shrink said film in said article, the improvement in which said film between said magazine rolls and said heating zone is perforated with a pair of perforation lines extending across the width of the film and spaced longitudinally of the film, said film being wrapped at said wrapping station in relation to the article such that the lines of perforation are in a pre-selected position whereby to provide a tear strip in said wrapping for readily opening said wrapping.
2. A method as claimed in claim 1, in which the lines of perforation are substantially parallel.
3. A method as claimed in claim 1, in which the lines of perforations are diverged.
4. A method as claimed in claim 1, 2 or 3, in which the lines of perforation are effected by reciprocation of a double edged knife element.
5. A method as claimed in claim 1, 2 or 3 in which the lines of perforation are effected by a pair of knife elements spaced longitudinally of said film.
6. A method as claimed in claim 1, 2 or 3, in which sealing is effected along a zone of superimposed films, the perforations in the plastic film being made in said zone.

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7. A method as claimed in claim 1, 2 or 3, in which the film is perforated between the magazine rolls and said wrapping station.

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ABSTRACT OF THE DISCLOSURE

The present invention provides in the wrapping of at least one article in a plastic film by the "shrunk-on" film wrapping method, which method comprises continuously conveying the articles to be wrapped to a wrapping station, wrapping said articles at said wrapping station in a heat shrinkable plastic film continuously passed to said wrapping station from film magazine rolls, heat sealing said film wrapped around said article along at least one sealing seam; separating said sealed and wrapped film from the film passing to said wrapping station and passing said article wrapped in said film through a heating zone to shrink said film in said article, the improvement in which said film between said magazine rolls and said heating zone is perforated with a pair of perforation lines extending across the width of the film and spaced longitudinally of the film, said film being wrapped at said wrapping station in relation to the article such that the lines of perforation are in a pre-selected position whereby to provide a tear strip in said wrapping for readily opening said wrapping.

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Fig. 1

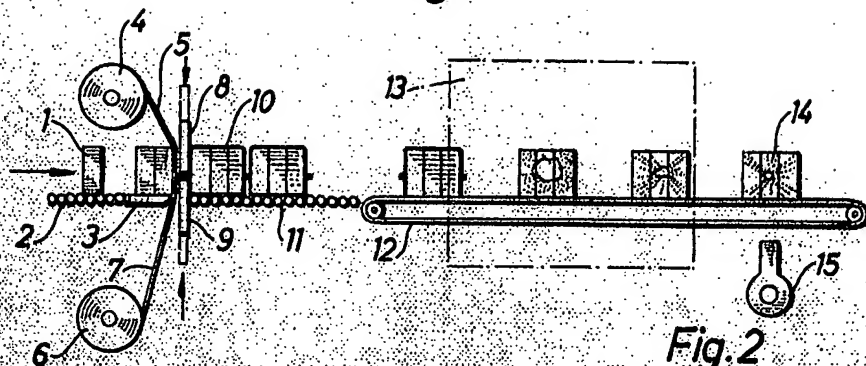


Fig. 2

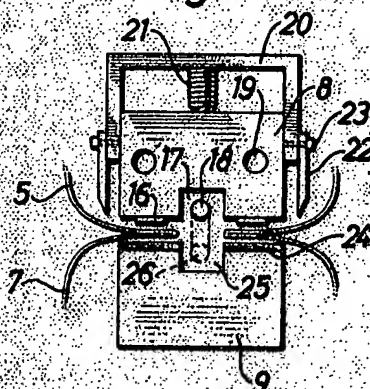


Fig. 3

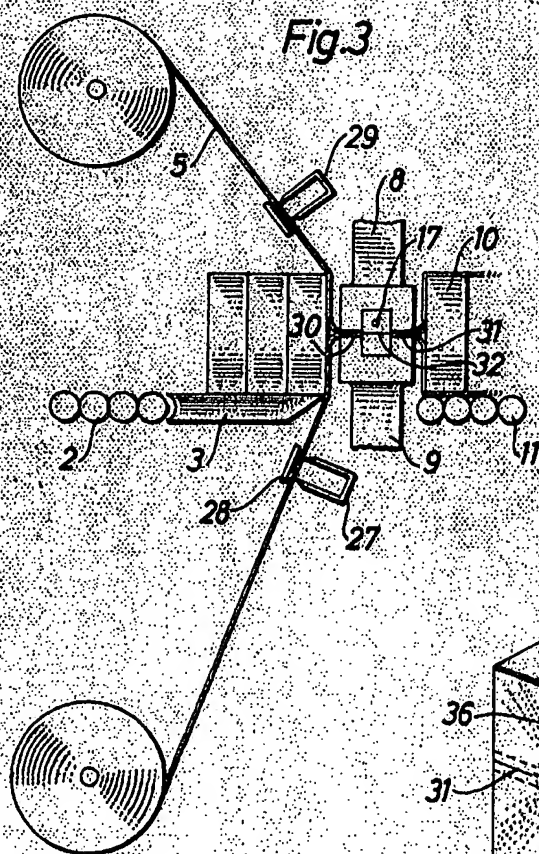
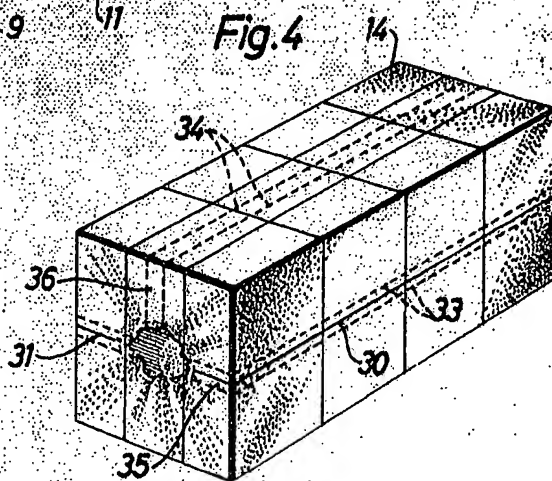


Fig. 4



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